# Hit List

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

**Search Results -** Record(s) 1 through 10 of 10 returned.

---

☐ 1. Document ID: US 5887657 A

**Using default format because multiple data bases are involved.**

L7: Entry 1 of 10 File: USPT Mar 30, 1999

US-PAT-NO: 5887657
DOCUMENT-IDENTIFIER: US 5887657 A
**** See image for Certificate of Correction ****

TITLE: Pressure test method for permanent downhole wells and apparatus therefore

DATE-ISSUED: March 30, 1999

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Bussear; Terry R. | Friendswood | TX | | |
| Weightman; Bruce E. | Aberdeenshire | | | GB |

US-CL-CURRENT: 166/336; 166/316, 166/64

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw. D

---

☐ 2. Document ID: US 5868201 A

L7: Entry 2 of 10 File: USPT Feb 9, 1999

US-PAT-NO: 5868201
DOCUMENT-IDENTIFIER: US 5868201 A

TITLE: Computer controlled downhole tools for production well control

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw. D

---

☐ 3. Document ID: US 5803167 A

L7: Entry 3 of 10 File: USPT Sep 8, 1998

US-PAT-NO: 5803167
DOCUMENT-IDENTIFIER: US 5803167 A
**** See image for Certificate of Correction ****

TITLE: Computer controlled downhole tools for production well control

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

---

☐ 4. Document ID: US 5732776 A
L7: Entry 4 of 10 File: USPT Mar 31, 1998

US-PAT-NO: 5732776
DOCUMENT-IDENTIFIER: US 5732776 A

TITLE: Downhole production well control system and method

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

---

☐ 5. Document ID: US 5730219 A
L7: Entry 5 of 10 File: USPT Mar 24, 1998

US-PAT-NO: 5730219
DOCUMENT-IDENTIFIER: US 5730219 A

TITLE: Production wells having permanent downhole formation evaluation sensors

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

---

☐ 6. Document ID: US 5721538 A
L7: Entry 6 of 10 File: USPT Feb 24, 1998

US-PAT-NO: 5721538
DOCUMENT-IDENTIFIER: US 5721538 A

TITLE: System and method of communicating between a plurality of completed zones in one or more production wells

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

---

☐ 7. Document ID: US 5706896 A
L7: Entry 7 of 10 File: USPT Jan 13, 1998

US-PAT-NO: 5706896
DOCUMENT-IDENTIFIER: US 5706896 A
**** See image for Certificate of Correction ****

TITLE: Method and apparatus for the remote control and monitoring of production wells

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

☐ 8. Document ID: US 5706892 A

L7: Entry 8 of 10 File: USPT Jan 13, 1998

US-PAT-NO: 5706892
DOCUMENT-IDENTIFIER: US 5706892 A
**** See image for Certificate of Correction ****

TITLE: Downhole tools for production well control

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

☐ 9. Document ID: US 5662165 A

L7: Entry 9 of 10 File: USPT Sep 2, 1997

US-PAT-NO: 5662165
DOCUMENT-IDENTIFIER: US 5662165 A

TITLE: Production wells having permanent downhole formation evaluation sensors

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

☐ 10. Document ID: US 5597042 A

L7: Entry 10 of 10 File: USPT Jan 28, 1997

US-PAT-NO: 5597042
DOCUMENT-IDENTIFIER: US 5597042 A

TITLE: Method for controlling production wells having permanent downhole formation evaluation sensors

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

| Terms | Documents |
|---|---|
| L6 and (wireles$3 or gps or global position system) same activit$3 | 10 |

**Display Format:** - Change Format

Previous Page Next Page Go to Doc#

# Refine Search

**Search Results -**

| Terms | Documents |
|---|---|
| L6 and (wireles$3 or gps or global position system) same activit$3 | 10 |

**Database:**

US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

**Search:** L7

Refine Search

Recall Text

Clear

Interrupt

**Search History**

**DATE: Friday, March 19, 2004** Printable Copy Create Case

| **Set Name** side by side | **Query** | **Hit Count** | **Set Name** result set |
|---|---|---|---|
| | *DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ* | | |
| L7 | L6 and (wireles$3 or gps or global position system) same activit$3 | 10 | L7 |
| L6 | L5 and l1 | 1298 | L6 |
| L5 | fish$3 | 348991 | L5 |
| L4 | L3 and monitor$ same remot$ | 10 | L4 |
| L3 | L2 and (portable or pda or laptop or palm or cell$) same monitor$ same remot$ | 10 | L3 |
| L2 | L1 and fish$ | 1321 | L2 |
| L1 | wellbore | 15370 | L1 |

END OF SEARCH HISTORY

# Hit List

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

**Search Results -** Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 20040015132 A1

**Using default format because multiple data bases are involved.**

L2: Entry 1 of 2 File: PGPB Jan 22, 2004

PGPUB-DOCUMENT-NUMBER: 20040015132
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20040015132 A1

TITLE: Method for improving patient compliance with a medical program

PUBLICATION-DATE: January 22, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Brown, Eric | Newport Beach | CA | US | |

US-CL-CURRENT: 604/131; 600/300, 705/3

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

☐ 2. Document ID: US 20030126593 A1

L2: Entry 2 of 2 File: PGPB Jul 3, 2003

PGPUB-DOCUMENT-NUMBER: 20030126593
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030126593 A1

TITLE: Interactive physiological monitoring system

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw De

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

| Terms | Documents |
|---|---|
| (20040015132 or 20030126593) | 2 |

**Display Format:** [-] Change Format

Previous Page Next Page Go to Doc#

First Hit Fwd Refs

Generate Collection Print

L7: Entry 5 of 10 File: USPT Mar 24, 1998

DOCUMENT-IDENTIFIER: US 5730219 A
TITLE: Production wells having permanent downhole formation evaluation sensors

Brief Summary Text (7):
Before describing the current state-of-the-art relative to such production well control systems and methods, a brief description will be made of the production systems, per se, in need of control. One type of production system utilizes electrical submersible pumps (ESP) for pumping fluids from downhole. In addition, there are two other general types of productions systems for oil and gas wells, namely plunger lift and gas lift. Plunger lift production systems include the use of a small cylindrical plunger which travels through tubing extending from a location adjacent the producing formation down in the borehole to surface equipment located at the open end of the borehole. In general, fluids which collect in the borehole and inhibit the flow of fluids out of the formation and into the wellbore, are collected in the tubing. Periodically, the end of the tubing is opened at the surface and the accumulated reservoir pressure is sufficient to force the plunger up the tubing. The plunger carries with it to the surface a load of accumulated fluids which are ejected out the top of the well thereby allowing gas to flow more freely from the formation into the wellbore and be delivered to a distribution system at the surface. After the flow of gas has again become restricted due to the further accumulation of fluids downhole, a valve in the tubing at the surface of the well is closed so that the plunger then falls back down the tubing and is ready to lift another load of fluids to the surface upon the reopening of the valve.

Brief Summary Text (34):
The multizone and/or multiwell control system of this invention is composed of multiple downhole electronically controlled electromechanical devices (sometimes referred to as downhole modules), and multiple computer based surface systems operated from multiple locations. Important functions for these systems include the ability to predict the future flow profile of multiple wells and to monitor and control the fluid or gas flow from either the formation into the wellbore, or from the wellbore to the surface. The control system of the second embodiment of this invention is also capable of receiving and transmitting data from multiple remote locations such as inside the borehole, to or from other platforms, or from a location away from any well site.

Brief Summary Text (35):
The downhole control devices interface to the surface system using either a wireless communication system or through an electrical hard wired connection. The downhole control systems in the wellbore can transmit and receive data and/or commands to/from the surface system. The data transmission from inside the wellbore can be done by allowing the surface system to poll each individual device in the hole, although individual devices will be allowed to take control of the communications during an emergency. The devices downhole may be programmed while in the wellbore by sending the proper command and data to adjust the parameters being monitored due to changes in borehole and flow conditions and/or to change its primary function in the wellbore.

Detailed Description Text (3):
As will be discussed in some detail hereinafter in connection with FIGS. 2, 6 and

7, in accordance with a preferred embodiment of the present invention, the downhole control system is composed of downhole sensors, downhole control electronics and downhole electromechanical modules that can be placed in different locations (e.g., zones) in a well, with each downhole control system having a unique electronics address. A number of wells can be outfitted with these downhole control devices. The surface control and monitoring system interfaces with all of the wells where the downhole control devices are located to poll each device for data related to the status of the downhole sensors attached to the module being polled. In general, the surface system allows the operator to control the position, status, and/or fluid flow in each zone of the well by sending a command to the device being controlled in the wellbore.

Detailed Description Text (4):
As will be discussed hereinafter, the downhole control modules for use in the multizone or multiwell control system of this invention may either be controlled using an external or surface command as is known in the art or the downhole control system may be actuated automatically in accordance with a novel control system which controls the activities in the wellbore by monitoring the well sensors connected to the data acquisition electronics. In the latter case, a downhole computer (e.g., microprocessor) will command a downhole tool such as a packer, sliding sleeve or valve to open, close, change state or do whatever other action is required if certain sensed parameters are outside the normal or preselected well zone operating range. This operating range may be programmed into the system either prior to being placed in the borehole or such programming may be effected by a command from the surface after the downhole control module has been positioned downhole in the wellbore.

Detailed Description Text (6):
As mentioned, each platform 12 is associated with a plurality of wells 14. For purposes of illustration, three wells are depicted as being associated with platform number 1 with each well being identified as well number 1, well number 2 and well number N. As is known, a given well may be divided into a plurality of separate zones which are required to isolate specific areas of a well for purposes of producing selected fluids, preventing blowouts and preventing water intake. Such zones may be positioned in a single vertical well such as well 19 associated with platform 2 shown in FIG. 1 or such zones can result when multiple wells are linked or otherwise joined together. A particularly significant contemporary feature of well production is the drilling and completion of lateral or branch wells which extend from a particular primary wellbore. These lateral or branch wells can be completed such that each lateral well constitutes a separable zone and can be isolated for selected production. A more complete description of wellbores containing one or more laterals (known as multilaterals) can be found in U.S. Pat. Nos. 4,807,407, 5,325,924 and U.S. application Ser. No. 08/187,277 (now U.S. Pat. No. 5,411,082), all of the contents of each of those patents and applications being incorporated herein by reference.

Detailed Description Text (8):
As discussed, the multiwell/multizone control system of the present invention is comprised of multiple downhole electronically controlled electromechanical devices and multiple computer based surface systems operated form multiple locations. An important function of these systems is to predict the future flow profile of multiple wells and monitor and control the fluid or gas flow from the formation into the wellbore and from the wellbore into the surface. The system is also capable of receiving and transmitting data from multiple locations such as inside the borehole, and to or from other platforms 1, 2 or N or from a location away from any well site such as central control center 10.

Detailed Description Text (9):
The downhole control systems 22 will interface to the surface system 24 using a wireless communication system or through an electrical wire (i.e., hardwired)

connection. The downhole systems in the wellbore can transmit and receive data and/or commands to or from the surface and/or to or from other devices in the borehole. Referring now to FIG. 5, the surface system 24 is composed of a computer system 30 used for processing, storing and displaying the information acquired downhole and interfacing with the operator. Computer system 30 may be comprised of a personal computer or a work station with a processor board, short term and long term storage media, video and sound capabilities as is well know. Computer control 30 is powered by power source 32 for providing energy necessary to operate the surface system 24 as well as any downhole system 22 if the interface is accomplished using a wire or cable. Power will be regulated and converted to the appropriate values required to operate any surface sensors (as well as a downhole system if a wire connection between surface and downhole is available).

Detailed Description Text (10):
A surface to borehole transceiver 34 is used for sending data downhole and for receiving the information transmitted from inside the wellbore to the surface. The transceiver converts the pulses received from downhole into signals compatible with the surface computer system and converts signals from the computer 30 to an appropriate communications means for communicating downhole to downhole control system 22. Communications downhole may be effected by a variety of known methods including hardwiring and wireless communications techniques. A preferred technique transmits acoustic signals down a tubing string such as production tubing string 38 (see FIG. 2) or coiled tubing. Acoustical communication may include variations of signal frequencies, specific frequencies, or codes or acoustical signals or combinations of these. The acoustical transmission media may include the tubing string as illustrated in U.S. Pat. Nos. 4,375,239; 4,347,900 or 4,378,850, all of which are incorporated herein by reference. Alternatively, the acoustical transmission may be transmitted through the casing stream, electrical line, slick line, subterranean soil around the well, tubing fluid or annulus fluid. A preferred acoustic transmitter is described in U.S. Pat. No. 5,222,049, all of the contents of which is incorporated herein by reference thereto, which discloses a ceramic piezoelectric based transceiver. The piezoelectric wafers that compose the transducer are stacked and compressed for proper coupling to the medium used to carry the data information to the sensors in the borehole. This transducer will generate a mechanical force when alternating current voltage is applied to the two power inputs of the transducer. The signal generated by stressing the piezoelectric wafers will travel along the axis of the borehole to the receivers located in the tool assembly where the signal is detected and processed. The transmission medium where the acoustic signal will travel in the borehole can be production tubing or coil tubing.

Detailed Description Text (24):
Referring again to FIG. 5, the control surface system 24 further includes a printer/plotter 40 which is used to create a paper record of the events occurring in the well. The hard copy generated by computer 30 can be used to compare the status of different wells, compare previous events to events occurring in existing wells and to get formation evaluation logs. Also communicating with computer control 30 is a data acquisition system 42 which is used for interfacing the well transceiver 34 to the computer 30 for processing. The data acquisition system 42 is comprised of analog and digital inputs and outputs, computer bus interfaces, high voltage interfaces and signal processing electronics. An embodiment of data acquisition sensor 42 is shown in FIG. 5C and includes a pre-amplifier 320, band pass filter 322, gain controlled amplifier 324 and analog to digital converter 326. The data acquisition system (ADC) will process the analog signals detected by the surface receiver to conform to the required input specifications to the microprocessor based data processing and control system. The surface receiver 34 is used to detect the pulses received at the surface from inside the wellbore and convert them into signals compatible with the data acquisition preamplifier 320. The signals from the transducer will be low level analog voltages. The preamplifier 320 is used to increase the voltage levels and to decrease the noise levels

encountered in the original signals from the transducers. Preamplifier 320 will also buffer the data to prevent any changes in impedance or problems with the transducer from damaging the electronics. The bandpass filter 322 eliminates the high and low frequency noises that are generated from external sources. The filter will allow the signals associated with the transducer frequencies to pass without any significant distortion or attenuation. The gain controlled amplifier 324 monitors the voltage level on the input signal and amplifies or attenuates it to assure that it stays within the acquired voltage ranges. The signals are conditioned to have the highest possible range to provide the largest resolution that can be achieved within the system. Finally, the analog to digital converter 326 will transform the analog signal received from the amplifier into a digital value equivalent to the voltage level of the analog signal. The conversion from analog to digital will occur after the microprocessor 30 commands the tool to start a conversion. The processor system 30 will set the ADC to process the analog signal into 8 or 16 bits of information. The ADC will inform the processor when a conversion is taking place and when it is competed. The processor 30 can at any time request the ADC to transfer the acquired data to the processor.

Detailed Description Text (25):
Still referring to FIG. 5, the electrical pulses from the transceiver 34 will be conditioned to fit within a range where the data can be digitized for processing by computer control 30. Communicating with both computer control 30 and transceiver 34 is a previously mentioned modem 36. Modem 36 is available to surface system 24 for transmission of the data from the well site to a remote location such as remote location 10 or a different control surface system 24 located on, for example, platform 2 or platform N. At this remote location, the data can be viewed and evaluated, or again, simply be communicated to other computers controlling other platforms. The remote computer 10 can take control over system 24 interfacing with the downhole control modules 22 and acquired data from the wellbore and/or control the status of the downhole devices and/or control the fluid flow from the well or from the formation. Also associated with the control surface system 24 is a depth measurement system which interfaces with computer control system 30 for providing information related to the location of the tools in the borehole as the tool string is lowered into the ground. Finally, control surface system 24 also includes one or more surface sensors 46 which are installed at the surface for monitoring well parameters such as pressure, rig pumps and heave, all of which can be connected to the surface system to provide the operator with additional information on the status of the well.

Detailed Description Text (26):
Surface system 24 can control the activities of the downhole control modules 22 by requesting data on a periodic basis and commanding the downhole modules to open, or close electromechanical devices and to change monitoring parameters due to changes in long term borehole conditions. As shown diagrammatically in FIG. 1, surface system 24, at one location such as platform 1, can interface with a surface system 24 at a different location such as platforms 2 or N or the central remote control sensor 10 via phone lines or via wireless transmission. For example, in FIG. 1, each surface system 24 is associated with an antenna 48 for direct communication with each other (i.e., from platform 2 to platform N), for direct communication with an antenna 50 located at central control system 10 (i.e., from platform 2 to control system 10) or for indirect communication via a satellite 52. Thus, each surface control center 24 includes the following functions:

Detailed Description Text (28):
2. Processes the acquired information from the wellbore to provide the operator with formation, tools and flow status;

Detailed Description Text (34):
2. Acquire, process, display and/or store at the surface data transmitted from downhole relating to the wellbore fluids, gases and tool status parameters acquired

by sensors in the wellbore;

Detailed Description Text (35):
3. Provide an operator with the ability to control tools downhole by sending a specific address and command information from the central control center 10 or from an individual surface control center 24 down into the wellbore;

Detailed Description Text (39):
7. Acquire, process and transmit to the surface from inside the wellbore multiple parameters related to the well status, fluid condition and flow, tool state and geological evaluation;

Detailed Description Text (42):
10. Provide data and control information among systems in the wellbore.

Detailed Description Text (57):
It will be appreciated that downhole valves are used for opening and closing of devices used in the control of fluid flow in the wellbore. Such electromechanical downhole valve devices will be actuated by downhole computer 50 either in the event that a borehole sensor value is determined to be outside a safe to operate range set by the operator or if a command is sent from the surface. As has been discussed, it is a particularly significant feature of this invention that the downhole control system 22 permits automatic control of downhole tools and other downhole electronic control apparatus without requiring an initiation or actuation signal from the surface or from some other external source. This is in distinct contrast to prior art control systems wherein control is either actuated from the surface or is actuated by a downhole control device which requires an actuation signal from the surface as discussed above. It will be appreciated that the novel downhole control system of this invention whereby the control of electromechanical devices and/or electronic control apparatus is accomplished automatically without the requirement for a surface or other external actuation signal can be used separately from the remote well production control scheme shown in FIG. 1.

Detailed Description Text (59):
Controllers 22 in each of zones 1, 2 and N have the ability not only to control the electromechanical devices associated with each of the downhole tools but also have the ability to control other electronic control apparatus which may be associated with, for example, valving for additional fluid control. The downhole control systems 22 in zones 1, 2 and N further have the ability to communicate with each other (for example through hard wiring) so that actions in one zone may be used to effect the actions in another zone. This zone to zone communication constitutes still another important feature of the present invention. In addition, not only can the downhole computers 50 in each of control systems 22 communicate with each other, but the computers 50 also have ability (via transceiver system 52) to communicate through the surface control system 24 and thereby communicate with other surface control systems 24 at other well platforms (i.e., platforms 2 or N), at a remote central control position such as shown at 10 in FIG. 1, or each of the processors 50 in each downhole control system 22 in each zone 1, 2 or N can have the ability to communicate through its transceiver system 52 to other downhole computers 50 in other wells. For example, the downhole computer system 22 in zone 1 of well 2 in platform 1 may communicate with a downhole control system on platform 2 located in one of the zones or one of the wells associated therewith. Thus, the downhole control system of the present invention permits communication between computers in different wellbores, communication between computers in different zones and communication between computers from one specific zone to a central remote location.

Detailed Description Text (61):
Referring to FIG. 3, an enlarged view of zones 2 and N from well 2 of platform 1 is shown. As discussed, a plurality of downhole flow sensors 56 and downhole formation

evaluation sensors 58 communicate with downhole controller 22. The sensors are permanently located downhole and are positioned in the completion string and/or in the borehole casing. In accordance with still another important feature of this invention, formation evaluation sensors may be incorporated in the completion string such as shown at 58A-C in zone 2; or may be positioned adjacent the borehole casing 78 such as shown at 58D-F in zone N. In the latter case, the formation evaluation sensors are hardwired back to control system 22. The formation evaluation sensors may be of the type described above including density, porosity and resistivity types. These sensors measure formation geology, formation saturation, formation porosity, gas influx, water content, petroleum content and formation chemical elements such as potassium, uranium and thorium. Examples of suitable sensors are described in commonly assigned U.S. Pat. No. 5,278,758 (porosity), U.S. Pat. No. 5,134,285 (density) and U.S. Pat. No. 5,001,675 (electromagnetic resistivity), all of the contents of each patent being incorporated herein by reference. It will be appreciated by those skilled in the art that generally, formation evaluation sensors require some type of external stimulus (e.g. electromagnetic radiation, acoustic signals, radioactive energy, etc.) that travels into the formation with the return signal being received by the formation evaluation sensor after being modified in some way by the formation. Such "active" formation evaluation sensors can be contrasted with the generally "passive" conventional downhole temperature, pressure and flow sensors in that the parameters sensed by the "active" formation evaluation sensors are not normally present within the wellbore.

Detailed Description Text (112):
The remotely controlled inflation/deflation device of the present invention offers many features and advantages. For example, the present invention eliminates the present standard industry design for pressure actuated shear mechanisms which are subject to wide variations in actuation pressures and premature inflation. The present invention provides a directly controllable mechanism for initiation of downhole tool inflation and through the unique self cleaning inflation control valve configuration shown in FIG. 10, obsoletes present design configurations which are subject to fouling by debris in the inflation fluid. In addition, the present invention enables direct control of closure of the inflation valve whereas in the prior art, spring loaded and pressure actuated designs resulted in pressure loss during operation and unreliable positive sealing action. The use of a motor driven, mechanical inflation control valve also constitutes an important feature of this invention. Still another feature of this invention is the incorporation of electronic proximity sensors in relation to inflatable tools so as to ensure correct positioning of selective inflation tools. High angle/horizontal orientation of inflatable tools requires conveyance of inflation tools via coil tubing which is subject to substantial drag. In contrast to the present invention, the prior art has been limited to positioning of inflation tools by collet type devices or pressure operated devices, both of which were highly unreliable under these conditions. The use of a microprocessor in conjunction with an inflatable downhole tool and the use of a microprocessor based system to provide both inflation and deflation to control the downhole tools also constitute important features of this invention. The present invention thus enables multiple, resettable operations in the event that procedures may so require or in the event of initially incorrect positioning of tools within a wellbore. Finally, the present invention provides a continuous electronic pressure monitoring system to provide positive, real time wellbore and/zonal isolation integrity downhole.

Detailed Description Text (115):
The foregoing system described in FIG. 11A functions to provide a remotely actuated device which positively limits the downward movement of any tools used within the wellbore. A primary utilization of the tool stop includes use as a positioning device at close proximity (i.e. below) to a tool, for example or the side pocket mandrel 162. The system of this invention may also be used with other difficult to locate devices in high angle or horizontal wellbores. In this manner, when

activated as shown in FIG. 11A, the surface operator may proceed downward with a work string until contact is made with tool stop 168. The tools and/or work string being delivered downhole may then be pulled back up a known distance thus ensuring proper positioning to perform the intended function in the targeted receptacle. An alternative function would be as a general purpose safety device, positioned close to the bottom of the tubing string in the wellbore. The tool stop system of this invention would then be activated whenever wireline or coiled tubing operations are being performed above and within the wellbore. In the event that the work string or individual tools are accidentally dropped, the tool stop of this invention ensures that they are not lost downhole and provides for easy retrieval at the tool stop depth. After through tubing operations are concluded, the tool stop system of this invention is deactivated/retracted as shown in FIG. 11B to provide a clear tubing bore 164 for normal well production or injection. It will be appreciated that during use, motor 178 will actuate gearing 176 which in turn will rotate threaded shaft 170 so as to raise tool stop 168 to the position shown in FIG. 11A or lower (deactivate or withdraw) tool stop 168 to the retracted position shown in FIG. 11B. The motor will be digitally controlled by an electronics control module 22 provided in inductive coupler section 180. Control module 22 can either be actuated by a surface or external control signal or may be automatically actuated downhole based on preprogrammed instructions as described above with regard to FIG. 7.

Detailed Description Text (120):
The flow control assembly shown in FIG. 12 provides for regulation of liquid and/or gas flow from the wellbore to the tubing/casing annulus or vice versa. Flow control is exercised by separate fluid and gas flow regulator subsystems within the device. Encoded data/control signals are supplied either externally from the surface or subsurface via a data control path 222 and/or internally via the interaction of the pressure sensors 224 (which are located either upstream or downstream in the tubing conduit and in the annulus) and/or other appropriate sensors together with the on-board microprocessor 208 in a manner discussed above with regard to FIGS. 6 and 7.

Detailed Description Text (125):
Referring to FIG. 13, a remotely controlled downhole device is shown which provides for actuation of a viable downhole choke and positively seals off the wellbore above from downhole well pressure. This variable choke and shut-offvalve system is subject to actuation from the surface, autonomously or interactively with other intelligent downhole tools in response to changing downhole conditions without the need for physical reentry of the wellbore to position a choke. This system may also be automatically controlled downhole as discussed with regard to FIGS. 6 and 7. As will be discussed hereinafter, this system contains pressure sensors upstream and downstream of the choke/valve members and real time monitoring of the response of the well allows for a continuous adjustment of choke combination to achieve the desired wellbore pressure parameters. The choke body members are actuated selectively and sequentially, thus providing for wireline replacement of choke orifices if necessary.

Detailed Description Text (127):
As shown in FIG. 13, the ball valve chokes are positioned in a stacked configuration within the system and are sequentially actuated by the control rotation mechanism of the stepper motor, motor gearing and threaded drive shaft. Each ball valve choke is configured to have two functional positions: an "open" position with a fully open bore and an "actuated" position where the choke bore or closure valve is introduced into the wellbore axis. Each member rotates 90 .degree. pivoting about its respective central axis into each of the two functional positions. Rotation of each of the members is accomplished by actuation of the stepper motor which actuates the motor gearing which in turn drives the threaded drive shaft 246 such that the engaging gears 240, 242 or 244 will engage a respective ball valve choke 234 or 236 or shut-off valve 238. Actuation by the electronic controller 252 may be based, in part upon readings from pressure transducers 254 and 256 or by a control signal from the surface.

Detailed Description Text (128):
The variable choke and shut-off valve system of the present invention provides important features and advantages including a novel means for the selective actuation of a downhole adjustable choke as well as a novel means for installation of multiple, remotely or interactively controlled downhole chokes and shut-offvalves to provide tuned/optimized wellbore performance.

Legal Firm Name (1):
Fishman, Dionne & Cantor